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The quantitative importance of seasonal snowmelt and rainfall generated peak runoff for annual fluvial sediment budgets in four catchments in Swedish Lapland, Finnish Lapland and Iceland

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The quantitative importance of seasonal snowmelt and rainfall generated peak runoff has been investigated over several years in different cold environments. The studies reported here have been carried out in four selected catchments ($<$30 km^2) in Iceland, Swedish Lapland and Finnish Lapland. Monitoring programmes have been in operation since five (Iceland and Finland) to seven (Sweden) years. The main focus is on analysing the role of the factors morphoclimate, vegetation cover, ground frost, sediment availability, relief and human impact for the quantitative importance of seasonal snowmelt and rainfall generated peak runoff for annual fluvial sediment budgets in the four study areas. Direct comparison of the data collected in the different cold environments provides information on the varying quantitative importance of annual peak runoff events and contributes to getting more understanding of the spatial differentiation of cold environments and its dependency on environmental factors and human impact. The two catchments in sub-Arctic oceanic East Iceland are characterized by very steep alpine relief and a partly destroyed vegetation cover due to human impact. Austdalur (Basalt) is showing lower mechanical denudation rates than Hrafndalur (less resistant Rhyolite). The slightly less steep Latnjavagge in Arctic-oceanic Swedish Lapland (Mica Schist) shows lower mechanical denudation, which is mainly due to the stable and closed vegetation cover in this catchment and stable step-pool systems developed in the creeks. Kidisjoki in sub-Arctic Finnish Lapland (Gneisses) is situated in the low-relief area of the Baltic Shield and shows very low mechan-

ical denudation rates. All four catchments are characterized by restricted sediment availability. More than 90% of the annual fluvial sediment transport occurs within a few days during snowmelt and/or rainfall generated peak runoff. In Latnjavagge and Kidisjoki snowmelt generated peak runoff – connected with a mobilisation of channel pavements exposing fines - has significantly higher quantitative importance than rainfall generated peak runoff whereas in both Icelandic catchments rainfall generated peak runoff – often connected with debris flows on the slope systems and slope wash - has altogether higher quantitative importance for annual fluvial sediment budgets than snowmelt generated peak runoff.